Fermilab Long Range Planning Committee

Open Meeting on LHC

Fermilab, September 4, 2003

LHC Subcommittee
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Outline Agenda

- Overall Introduction (H. Montgomery)
- Vision for LHC at Fermilab (J. Womersley)
- LHC Accelerator Research Project (J. Strait)
- Detector R&D (J. Freeman)
- CMS Tier 1 Center and Computing (L. Bauerdick)
- Ideas for a Theory Center (M. Carena)
- Ideas for Physics Analysis (R. Demina)

- We have 2 hours overall. There will be time for 5-10 minutes of discussion after each talk, but I'd like to have enough time for a "where do we go from here" discussion at the end.

LHC Physics

- Of course you are supposed to know this, but the LHC will determine
  - What is responsible for EW symmetry breaking?
    - SM Higgs or…
  - Is there other new physics at the TeV scale that resolves the hierarchies and infinities of the Standard Model?
    - Supersymmetry or…

- Central challenge for HEP. For example, at Lepton-Photon 2003
  - Ed Witten:
    - importance of experiment leading theory again, "as is natural"
  - Hitoshi Murayama
    - Our uncertainty of the physics at the TeV scale is like a cloud, blocking our view to what lies beyond

- It is critical both for Fermilab and for the US HEP community that we play a central role in unlocking this physics

A vision for the LHC at Fermilab

- A role in LHC that is commensurate with the scale of Fermilab now and our future hoped for role in world HEP
- CMS Physics Analysis Center
  - Not just
    - Allow Fermilab to be a very competent collaborating institution
    - "the best place to get your data from"
    - "the best place to be if you can't be at CERN"
  - But "the best place to be if you want to do physics"
    - Why not?
  - Must enhance US physics potential overall, and improve the return on US investment in CMS and LHC
- A leading center (the leading center?) for LHC theory/phenomenology
- A leading center (the leading center?) for detector development and accelerator development for the LHC luminosity upgrades

What would this need?

- Physicists
  - How many?
  - How to get the best?
- Computer infrastructure (regional center)
- The best buildings/facilities/working environment/VC
  - Better than at universities
  - Better than at CERN(?!)
  - Includes social aspects/quality of life
- Synergies
  - Theorists
  - Other experiments
  - Nearby universities
  - Detector and accelerator work
- Core of Fermilab people resident at CERN(?)
- CMS visitors coming here
- Host one (or more) of the physics analysis groups here
  - Meetings to present/approve results here
  - People from CERN come here, not always vice versa

We need your input

- **Need input from the user community:**
  - **especially US-CMS collaborators and CDF/DO members**
    - **What do you want from Fermilab in the operations phase?**
    - **What would make Fermilab an attractive place to work?**
    - **Does the vision outlined here resonate with you?**
    - **How do we get there?**
      - We need a clear view of what we should we be doing this year, next year to make it a reality

- **Hence this meeting!**